

VALIDITY OF REPORTED LIFE INSURANCE SURVEY DATA

by

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INTRODUCTION

Life insurance is a means by which families may increase their financial security. In 1960, two out of three persons in the United States were life insurance policyholders. The average amount of life insurance ownership per family rose from \$4,600 in 1950 to \$10,200 in 1960 (Institute of Life Insurance, 1961).

Life insurance may be defined as a contract whereby for a stipulated compensation, called the premium, one party (the insurer) agrees to pay the other (the insured) or his beneficiary a fixed sum upon death or some other specified event (Huebner, 1950).

Insurance studies, conducted in Kansas, reveal that life insurance is an integral part of families' financial security plans. Krebs (1960) reported that of the 527 Kansas farm operator families interviewed in 1956, 71 per cent insured one or more members of the family. Another state-wide survey in 1960 revealed five rural families in six had life insurance, and that one family in five planned to add more life insurance within the next five years (Morse, 1962). Non-farm families included in the 1960 study reported greater possession of insurance than farm families. Only four of the 89 non-farm families had never insured at least one member (Rogers, 1962). In general, those families which reportedly felt secure also responded that they held the right amount of insurance. Their opinions toward insurance showed a reliance upon life insurance as a measure of security (Morse, 1962).

Families purchasing life insurance have a choice of many companies. In 1960, in the State of Kansas, 199 life insurance companies were authorized to sell insurance (Sullivan, 1961). Each of these companies offers many types of policies. Thus, families are faced with numerous alternatives when making decisions concerning life insurance, both in choice of company and in choice of policy.

The number of families insured indicates extensive use being made of life insurance. The variety of policies indicates opportunity for selective buying or a potential for confusion. It is appropriate, therefore, that studies be made of how well insurance does fulfill a family's desire for security. The 1960 study, which provided data used in this thesis, was undertaken for the purpose of giving a better understanding of family financial security and the role that life insurance plays. The purpose of this thesis was to evaluate the validity of the data obtained in the 1960 survey.

Data of life insurance holdings may be obtained in one of two ways: (1) start with policies held by companies and trace the policyholders through company records; or (2) start with population surveys and inquire as to the policy holdings of the interviewed families. An example of the first approach is the study made by Dinitz (1955). Policyholders were selected from files of Nationwide Mutual Insurance Company in order to study the relation between socio-economic variables, and insurance coverage and attitudes. Socio-economic data were obtained by

means of follow-up personal interviews with policyholders. Examples of the second approach were given by Krebs (1961) and Rogers (1962). These studies included data obtained by interviewing a sample chosen at random from Kansas farm and rural non-farm populations, respectively.

The first approach provided accurate information about policies held, but was limited in that only policyholders were contacted and the conclusions pertained only to the population of policyholders. The second approach included the total population, regardless of policyholder status, so generalizations about the total population were appropriate; however, specific information about the policies held might have been limited. The policyholders were asked to recall from memory details concerning the type of policy held, or asked to present their policies for examination by interviewers. The latter is time consuming, embarrassing, and difficult; the former is easier, less expensive, and less demanding, although subject to errors of recall. It is the recall method which is of concern in this study.

The purpose of this study was to secure an estimate of the error made in life insurance information obtained from recall. Attention is given to the variation in the amount of error when data are sorted by socio-economic factors and factors relating to life insurance policies.

Objectives

The objectives of this thesis were to obtain an estimate of the discrepancy between premium values as reported by respondents

and as derived from published rate tables. A second objective was to study how the discrepancy varied by education, net worth, place of residence (farm or non-farm), age of respondent, policy face value, and when life insurance policies were purchased. The discrepancy between the actual (reported) and expected (rate-table) values is referred to as error.

SOME PREVIOUS STUDIES

Survey methods have been criticized because (1) the basic data are inaccurate, (2) surveys are costly, and (3) the "representativeness" of surveys based on samples is questionable (Jessen, 1947). Inaccuracies due to human and mechanical error will occur in most data. However, inaccuracies may be minimized by use of trained interviewers and well structured questions. The cost of a survey is related to its "representativeness." Samples are drawn from a total population because the costs involved in surveying a total population are prohibitive in most cases. Deming (1947) stated, "The bigger the job, the more liable it is to biases of various kinds that creep in and become troublesome. Many a small sample has been preferable to an attempted complete coverage."

Validity, reliability, and practicality are criteria frequently used in evaluating tests or survey devices. Validity refers to the extent to which a survey or a survey question measures what it is actually designed to measure. Reliability has to do with the precision of a measurement procedure or how

precisely the results will be reproduced when similar tests are made. Practicality is concerned with factors of economy, convenience, and interpretability that determine whether a test or survey is practical for widespread use (Thorndike and Hagen, 1955).

Sampling, response, and non-response errors affect the validity and reliability of survey data. Error, used in the general sense, refers to deviation of the survey value statistic from its true value regardless of its source. Sampling error arises because a sample rather than the total population was interviewed. This error is subject to estimation if the study is performed under certain conditions, and the range of the confidence limits within which the "true value" lies can be stated with a known degree of probability. For example, sampling procedures are well developed by the Bureau of the Census. The reports explicitly state what the probability is that the true sample value would lie within specific confidence limits if a sample were to be repeated or if a complete count of a sample population were to be made. The probability level is usually set at the 95 per cent level (U. S. Bureau of Census, 1961). Similar statements can be found in other analyses which are in compliance with probability sampling (U. S. Department of Health, Education and Welfare, 1958; Board of Governors of the Federal Reserve System, 1961).

Non-response errors are related to problems in sample selection because sample units may not be available for interviews.

This violates probability sampling methods as units are included in the sample without either an equal or known probability. Techniques are offered for offsetting such errors. For example, additional units may be drawn to replace non-respondents, or attempts may be made at call-backs.

Response errors are of primary concern in this thesis. Lansing (1961) defined response error as the difference between a reported value and the actual value of a statistic if the respondent could and would convey the full truth. Biases in response can result from many sources. Morse (1951) outlined sources of bias resulting from question phrasing and some related problems. Several examples given are: (1) respondents may be unable to express themselves or may not fully understand the question asked; (2) respondents may be unable to remember the true facts; (3) respondents may not be aware of the true answer or may intentionally give false answers; or (4) respondents may be influenced by the way the question is asked by the interviewer. The existence and importance of response errors in reports of some types of data in financial surveys has led to serious concern as to the validity and reliability of the data.

Selected studies relating to testing the validity of data collected in consumer finance surveys are reviewed in so far as they bear on two main areas: (1) measure of validity of information given by respondents in answer to survey questions (Nuckols, 1963; Ferber, 1963; and Lansing, 1961) and (2) techniques of schedule structuring and methods of interviewing (Lansing, 1961).

Nuckols (1963) compared the validity of life insurance survey results obtained by personal interview with results obtained by a mail questionnaire. Personal interviewing techniques were used to gather information from household heads chosen by probability sampling. The mail questionnaire was sent to a panel of 1,000 families, the names of which are maintained by National Family Organization (NFO) of Toledo, Ohio. The panel is designed to match the total population of United States families in terms of geographic region, city size, age of homemaker, and family income.

Validation of data given by respondents was possible in cases where the respondent correctly identified the company that issued the policy. Data collected by personal interview and mail questionnaire were compared with company records traced by name of company.

Unpublished results supplied to the author indicate that the data obtained through mail questionnaires were more accurate in regard to amount of insurance and premium outlay than those obtained by personal interview methods (Table 1).

Furthermore, as measured by comparing respondents' reports with company records, mail questionnaires resulted in more valid responses than personal interviews concerning types of policies (67% and 60%, respectively) and annual premiums paid (44% and 36%, respectively).

Nuckols justified this by stating, "Probably the most obvious explanation of the difference between the two sets of data is that the NFO respondents had more opportunity and possibly were

Table 1. Accuracy of respondent reports of life insurance ownership.

	:	Amount of life	:	
	:	insurance owned	:	Premium outlay
	:	Main study :NFO panel	:	Main study :NFO panel
	:	(interview): (mail)	:	(interview): (mail)
Error	:		Per cent	
Overstated		26	12	22
Accurate (+ 10%)		65	79	65
Understated		9	9	13
All		100	100	100
		(n=217)	(n=207)	(n=185)
				(n=175)

more motivated to check their policies before answering questions than did those in the main study."

To validate life insurance survey data, Ferber (1963) compared the face value of policies which respondents reportedly held with information provided by their insuring companies. An unpublished report supplied to the writer by Dr. Ferber indicates that companies provided information on face value on 341 policies reported by respondents. The respondents failed to report face value on one tenth of the 341 policies, which left 307 policies on which comparisons of face value were made. The respondent report either checked exactly or came within 10 per cent of the company report on 68 per cent of the 307 policies, was within 11 to 20 per cent of the company report on 7 per cent of the policies, and deviated by more than 20 per cent of the company report on 25 per cent of the policies.

A case study analysis of individual policies which deviated substantially (20% or more) in face value revealed that "... respondent's accidental errors due to ignorance or due to misrepresentation is responsible for about 78% of the number of such discrepancies. The more common tendency in these cases was to overreport the actual face value" (Ferber, 1963).

Three field experiments concerning savings accounts and cash loans were made by Lansing (1961) for the purpose of measuring the accuracy of information which people give to interviewers about their finances, and to test the difference in response error resulting from the use of different survey techniques. A variety of survey techniques was used, including personal interviewing with structured (fixed questions specifically describing information desired) and unstructured (no set questions asked) questions, mail-in questionnaires, and re-interview techniques.

Validation procedures in the first and third experiments concerning savings accounts employed the cooperation of savings institutions. After completion of the interview, the investigators transmitted a form to the saving institution and obtained necessary information to complete the analysis. In the case of the cash loans, data gained in the survey were compared with data available from files of known borrowers.

Results of Lansing's study may be summarized as follows:

- (1) People in the upper income group (over \$5,000) generally tended to report savings accounts more accurately but cash loans less accurately.

(2) People with higher education (college) tended to report information with greater accuracy than those with less education.

(3) Only small differences in accuracy of response were found to exist between white-collar workers and blue-collar workers.

(4) Age or sex of the respondent was not found to be significantly associated with accuracy of response.

Interview technique results show:

(1) Studies which focus attention on a limited topic are likely to obtain more accurate data on that topic than studies which are wide in scope.

(2) Use of structured questionnaires drew more valid responses than unstructured questionnaires.

(3) Re-interview resulted in improvement in accuracy.

In summary, several methods of validation have been used by researchers. Nuckols (1963) and Ferber (1963) tested the validity of life insurance survey data by tracing policies by the names of companies given by respondents. Lansing (1961) worked through cooperating financial institutions to find the "true values" for survey data concerning savings accounts and personal loans. In this study another method of validation is used: the actual premiums which respondents reported to the interviewer as the amount they pay annually is reduced to a per thousand basis and compared with premium values determined from published life insurance rate tables. The correctness of the rate table premium, as a comparison with the reported premium, rests upon the

correctness of the reported age at time of purchase, policy face value, name of the company, and the proper identification of type of policy.

PROCEDURE

Source of Data

The data for this study were obtained in an interview survey of family financial security made in 1960 of Kansas rural families. The 200 families (100 farm and 100 non-farm) interviewed had been selected at random to constitute an unbiased sample of rural families in Kansas. Rogers (1962) described the procedures for selection of the sample. The survey included such areas as insurance coverage, education, size and composition of the family, family's financial status, and attitudes toward insurance, education, and financial planning.

The survey schedule consisted of ten major parts: Parts I and II included questions concerning attitudes toward planning, and attitudes toward insurance; Part III, specific information on age, sex, family characteristics, and occupations; Part IV, characteristics of the families' insurance holdings; Part V, specific life insurance coverage and attitudes toward such coverage; Part VI, liability and casualty insurance; Part VII, the educational opinions and plans; Part VIII, sources of income and amount of income; Part IX, net worth and its composition; and Part X, an evaluation. A copy of the schedule is in the Appendix.

Questions in section IV of the schedule asked for specific information about life insurance policies carried on each member of the family: age or year of purchase; policy status (current, lapsed, dropped, or matured); type of policy (term, whole life, limited-pay, endowment, group, or other); face value (amount); amount of last premium paid; frequency of premium payment (annually, semi-annually, quarterly, or monthly); amount of premium last year; amount of dividends last year (if any); cash or loan value (amount); and, the type or name of the company. Open-end questions were asked about each policy: "Why was this policy purchased?" "What were the circumstances at the time you purchased it?"

Information regarding each individual policy was recorded on a separate line on the page in an effort to avoid confusion, and separate pages were provided for each member of the family. Answers were given from memory recall. The families were not asked to present their policies for examination by the interviewers.

Explanation of Terms

Terms, as used by the enumerator in completing the schedule forms and as used in editing, tabulating, and interpreting the corrected data for use in this thesis, are explained in the order in which the questions appeared in the schedule.

When Purchased (year or age). The year of purchase of the policy or the policyholder's age at time of purchase was recorded

on the schedule. Since only one was given and both were needed in the analysis, one was determined from the other. Current age (1960) given in another section of the schedule provided the information needed to convert one set of data into the other.

Policy Status. Policy status was recorded as current, lapsed, dropped, or matured. "Current" referred to policies on which premiums were currently (1960) being paid; "lapsed" policies were those on which the policyholder failed to pay the premium due and, after a grace period, the company terminated the policy; "dropped" indicated a voluntary termination on the part of the policyholder; and "matured" were policies on which all required premiums had been paid and the face value reverted to the policyholder. Paid-up insurance was also recorded as "matured."

Type of Policy. The types of policies were recorded as term, whole life, limited-payment life, endowment, group, and other. The interpretation which follows is consistent with Huebner (1950) and the Institute of Life Insurance (1961).

Term insurance is a contract which furnishes life insurance protection for a limited number of years, the face value of the policy being payable only if death occurs during the stipulated term. Term insurance is written for a specified number of years with or without a renewable clause. The policy premium will reflect the risk condition of the insured in question.

Whole life, variously referred to as ordinary, straight life, or level premium insurance, is an insurance plan whereby premiums are leveled to an actuarial equivalent instead of rising with

increased age until death of the policyholder.

Limited-payment life is a modified form of whole life insurance with premiums concentrated for a specified number of years, e.g., "twenty-pay life," until a specified age is attained, e.g., "paid-up at 65," or until the death of the policyholder if death occurs within the specified period. Concentration of premiums over a time period shorter than whole life results in higher premiums for a shortened period of time.

Endowment policies are similar to limited-pay, providing for payment of premiums for a specified length of time, until a specified age is reached, or until death if it occurs within the specified time. The difference lies in that the insured gets the face value if living at the specified age.

Group insurance provides insurance coverage under one master policy for all or a large portion of persons, such as employees of a firm. Group insurance is most frequently term insurance with premiums paid jointly by employer and employees.

Policies were recorded as "other" if they appeared to have been devised to fit particular needs. Family policies are an example of insurance recorded as "other."

Face Value (amount). Face value is the amount that appears on the face of the policy and that will be paid by the insurance company to the beneficiary in case of death of the insured, or to the policyholder if the policy matures before death.

Annual Premium (amount). "Last premium" (current policy), and "how often" (annually, semi-annually, quarterly, or monthly)

were recorded by the enumerator and were used to find the "annual premium" (amount). For families who paid premiums annually, the amount of last premium was the premium paid last year. For premiums paid more frequently than once a year, the amount of annual premium was calculated by multiplying last premium paid by frequency of payment.

Dividends Last Year (amount). Dividends are, in effect, a return of a part of the premium which exceeded the cost of insuring the policyholder. Dividends may be paid in cash to the policyholder, left with the company to apply on premium payments, or to accumulate interest. The net cost of insurance is the annual premium, or its equivalent, less the dividends.

Cash or Loan Value (estimate). Cash value is the amount which the policyholder would receive upon surrender of a level premium insurance policy before maturity. The cash value may also be taken as a loan with interest.

Type or Name of Company. Abbreviated classifications for typing the companies appeared on the schedule: ordinary, credit life, savings life, assessment, veterans administration, burial, and fraternal. More frequently, however, the actual name of the insuring company was recorded.

In this thesis, companies are classified as mutual, stock, fraternal, and government. Mutual companies are owned and controlled by its policyholders and generally issue participating policies which entitle the holder to share in the surplus earnings of the company through the payment of dividends.

Stock companies are owned and controlled by stockholders and generally issue non-participating policies which refer to insurance on which no dividends are paid.

Fraternal societies may offer life insurance for the benefit of members. Members are entitled to dividends when a surplus of funds is officially declared.

United States Government Life Insurance (USGLI) guaranteed renewable term insurance to a maximum of \$10,000 to servicemen in World War I. In 1941, National Service Life Insurance (NSLI) was established for men and women on active duty during World War II. Many insurance plans up to a maximum face value of \$10,000 were available to those who wished to invest. In 1951, Congress initiated a program which automatically provided \$10,000 coverage for persons on active duty and for 120 days thereafter. After separation from service, non-participating term insurance, renewable every five years, is available (Botts, 1959).

Other Questions. On the same page of the schedule were several attitudinal questions and "clean-up" questions about insurance coverages the respondents might have failed to recall. Question 15a asked: "Do you have additional life insurance to cover a specific debt or mortgage, such as installment credit, car purchase, home mortgage, credit union loan, other loans?" Other questions were not related to this study.

Data Selection

Eighty per cent of the 200 families interviewed currently

held some type of life insurance policy. These 160 family units owned a total of 547 policies, or a total of over \$1,526,770 in life insurance policies. Face value of these policies ranged from \$50 to \$25,000 and averaged almost \$3,000. The distribution of policies by type and face value is given in Table 2.

Table 2. Type and number of all current policies, total and average face value.

Policy		:	Face value	
Type	: Number	:	Total	: Average
Types included	451		\$1,266,045 (n=442)	\$2864
Limited-pay	251		560,714 (n=247)	2270
Whole life	109		286,443 (n=105)	2728
Term	59		299,610 (n= 59)	5078
Paid-up at 65	32		119,278 (n= 31)	3848
Types not included	96		260,725 (n= 75)	3476
Endowment	21		38,600 (n=21)	1838
Group	15		83,000 (n=13)	6385
Other	11		20,350 (n=10)	2035
Don't know	49		118,775 (n=31)	3831
All current policies	547		\$1,526,770 (n=517)	\$2953

This study limited the policies to the four most commonly held types: limited-pay 20, whole life, term, and paid-up at 65. Information concerning the other 96 policies was deemed so inadequate that they were eliminated from the study. Of the 451 policies, 142 were lacking in essential data, so analysis was limited to 309 "workable" policies. Summaries of these are presented first.

Preliminary investigation of the data revealed that premiums reported on 58 of the policies were grossly in error. In an effort to reduce the error due to gross overestimation and underestimation, the decision was made to eliminate from the second analysis the 58 policies on which actual premiums reported varied \$15 (plus or minus) from the expected premium calculated from life insurance rate tables. Thus, a second analysis based on 251 of the 309 policies is indicated by "selected" data. The 58 policies not included in the "selected" data contained 34 limited-pay 20, six whole life, and nine of each term and paid-up at 65. The tabulation of the policies and their disposition are shown on the following page.

	Number of policies	Families represented
Total current policies reported	547	160
Less endowment, group, other, and don't know	- 96	
Equals total number limited-pay 20, whole life, term, and paid-up at 65	451	148
Less "unworkable" policies	-142	
Equals "workable" policies	309	125
Less policies eliminated (gross overestimation or under- estimation	- 58	
Equals "selected" policies	251	114

Thus, two sets of tables are presented. The first set is based on the total "workable" data of 309 policies held by 125 families; the second set, on "selected" data of 251 policies held by 114 families. Both sets of tables are presented so the reader may have full opportunity to compare the results and to draw conclusions based on the total "workable" data and those which, in the judgment of the writer, are more informative.

A comparison of the policy face value based on all "workable" data and on the "selected" data is shown in Tables 3 and 4. The total face value of all current policies as shown in Table 2 was reduced by approximately one half if consideration is given only to the "selected" data, shown in Table 4.

Table 3. Number, total, and average face value of life insurance policies by type (all "workable" data).

Life insurance policy		Face value	
Type	: Number	Total	: Average
Limited-pay 20	173	\$402,314	\$2326
Whole life	71	196,690	2770
Term	39	199,000	5103
Paid-up at 65	26	104,778	4030
All	309	\$902,782	\$2922

Table 4. Number, total, and average face value of life insurance policies by type ("selected" data).

Life insurance policy		Face value	
Type	: Number	Total	: Average
Limited-pay 20	139	\$337,114	\$2425
Whole life	65	186,940	2876
Term	30	182,500	6083
Paid-up at 65	17	72,728	4278
All	251	\$779,282	\$3105

Method of Analysis

The procedure used in this study was to compare premiums paid on life insurance policies as expressed by respondents, with the expected premiums as determined from published life insurance rate tables. The difference between the reported and the expected values constitutes one measure of error made in reporting life insurance data. The term, error, as used in this thesis is the difference between the reported value of premiums and the expected value of the premiums, described as follows:

Reported Premium Values. Reported or actual premium values used in this descriptive analysis are the premiums paid on current life insurance policies as reported in the survey. Semi-annual, quarterly, or monthly premiums were adjusted to an equivalent annual premium per \$1,000 face value. Therefore, all reported premiums were on an annual per \$1,000 basis.

Expected Premium Values. Premiums charged by major and minor life insurance companies are compiled for use by the life insurance industry and by consumers. Basic facts needed to use the tables appropriately are: name of the company, type of policy, age at issue, and face value. Adjustments were made to enable appropriate reading of the tables. These adjustments will be discussed under the appropriate headings below.

Year Purchased. Premiums on life insurance policies purchased before 1948 were based on the American Experience Mortality Tables which reflected the average life expectancy determined by death rates of policyholders from 1843 to 1858. In 1948, life insurance companies adopted the Commissioners 1941 Standard Ordinary Mortality Table based on the lives and deaths of policyholders from 1930 to 1940 (Huebner, 1950).

Current life insurance policies, therefore, were sorted according to those purchased before 1948 and those purchased during 1948 and after. Expected premium rates for policies purchased before 1948 were taken from Unique Manual-Digest (1941); rates for policies purchased during and after 1948 were taken from Flitcraft Compend (1960).

Age at Purchase. Life insurance premium rates increase with the added risk of increasing age. Therefore, the age of the policyholder at the time the policy was purchased was used in finding the expected premium values.

Types of Policies. Expected premium values on limited-pay 20, whole life, and paid-up at 65 were read directly from life insurance rate tables. Length of coverage of term policies was not given on the schedule. For convenience an arbitrary term of five years was assumed and all term policies were regarded as five-year convertible or renewable.

Types of Companies. Participating and non-participating policies are sold by life insurance companies. Premium rates are lower on non-participating policies; however, the higher premium rates on participating policies are offset by dividend payments. Company names and limited information concerning dividends was given on the schedule. Companies were classified as to mutual, stock, or fraternal by reference to Business Figures Index of Fliteraft Compend (1960). Some companies were not listed. In such cases determination was based either on whether dividends were paid or on comparison of the reported premium paid with the premium charged by major participating and non-participating companies, and identifying the policy with that to which the premium most closely corresponded.

The amount of dividends received was generally lacking on the schedule. Therefore, the net cost of insurance premiums was not figured.

G. I. policies were treated separately from policies purchased from commercial agencies. National Service Life Insurance premium rates were used in determining expected values on G. I. policies.

Equitable (New York) life insurance policy premium rates were used as the standard expected premium values for all policies purchased from mutual companies or from stock companies writing policies on a participating basis. Aetna Life (Connecticut) insurance policy premium rates were used as the standard expected rates for all policies purchased on a non-participating basis. The companies were chosen on the basis of a comparison of the admitted assets of mutual and stock companies as listed in Flitcraft Compend (1960) which showed Equitable and Aetna to be among the largest companies. An analysis of the premium rates compared sufficiently with those charged by other companies that no serious error was anticipated by such an arbitrary selection of companies on which to base the expected premiums.

Face Value. Although the data were adjusted to the annual premium per \$1,000 face value, the fact that premium rates may vary with face value was not overlooked. The practice of graduating premium rates per thousand, with lower rates per \$1,000 face value for policies of high face value, has become more widespread during recent years. Therefore, adjustments recommended by Equitable (New York) and Aetna Life (Connecticut) in Flitcraft Compend (1960) were made in expected premium values of policies which were purchased during 1948 or after.

Measures of Error

Two measures are used to describe the results: the average relative error which measures the percentage by which the reported premiums tend to be over or under the rate table determined values; and, the average deviation which measures the consistency of the relative error within each group.

The average relative error is the arithmetic mean of the sum of percentages (sign considered) obtained by dividing the absolute error by the corresponding expected premium. The expected premium was obtained from published rate tables as described in the previous section. The difference between expected premium and the actual premium reported by the respondent is the absolute error. For example, if a policy of a specific age is shown in the premium rate book to have a premium of \$20 and the respondent reported the premium to be \$25, the absolute error is \$5 (\$25 minus \$20) and the relative error is .25 or 25 per cent. The mean relative error is found by dividing the sum of the relative errors (with sign considered) by the number of policies in the group.

The average deviation is the sum of the differences (sign not considered) between the computed relative error for each policy and the relative error for the group divided by the number of policies in that group. For example, if another person recorded a premium of \$15, the absolute error would be minus \$5, and the relative error would be minus 25 per cent. The mean relative error of the two would be 0 (minus 25% and plus 25%),

while the average deviation of the relative error would be 25 per cent ($25\% + 25\% \div 2 = 25\%$).

RESULTS

The results of this study are presented as descriptive statistical summaries. Statistical tests of significance have not been utilized because the data do not lend themselves to such treatment. The survey from which the data were obtained was designed for purposes other than to test validity of reported life insurance data. Nevertheless, this summary of results may suggest the existence of potentially significant information. If so, a study specifically designed for the purpose of measuring the validity of response error could be made.

The results are introduced by presenting the average relative error and the average deviation of relative error by type of policy for all "workable" data and the "selected" data. Following this overall view is an estimate of the percentage error and the consistency of the error for various socio-economic factors and factors relating to life insurance policies. The choice of variables was made on the basis of information available and considered to have a significant bearing on the magnitude of such error measurements. The variables included are: educational level, age of respondent, net worth, place of residence (farm or non-farm), policy face value, and year of purchase of the policy.

The average relative error (reported premium value relative to the expected premium value) ranged from 1 per cent

underestimation to 97 per cent overestimation when all "workable" data were analyzed (Table 5). Errors of overestimation were made in reporting premiums paid for limited-pay 20, term, and paid-up at 65 policies; errors of underestimation for premiums paid for whole life policies. Using the "selected" data (also Table 5) in which policy reports showing gross overestimation or underestimation of premiums were eliminated, the average relative error was reduced for limited-pay 20 (from 25% to 3%), for term (from 97% to 24%), and for paid-up at 65 policies (from 17% to -8%). However, the error on whole life policies was increased from -1 per cent to -8 per cent.

Table 5. Average relative error* by type of policy.

Data	:	:	Type of policy			
			Limited-	Whole	Term	Paid-up
	Number:	:	pay 20	life	:	at 65
All "workable"	309		25 (n=173)	-1 (n=71)	97 (n=39)	17 (n=26)
"Selected"	251		3 (n=139)	-8 (n=65)	24 (n=30)	- 8 (n=17)

* Percentage of expected premium.

The average deviation refers to a measure of the consistency of the relative error made in reporting premiums paid for life insurance policies. The consistency of the relative error by policy types when all "workable" data (Table 6) were analyzed was lower for whole life (30%) and limited-pay 20 (31%) than for paid-up at 65 (52%) and term policies (77%). The average

Table 6. Average deviation of relative error* by type of policy.

Data	Number	Type of policy			
		Limited-pay 20	Whole life	Term	Paid-up at 65
All "workable"	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)
"Selected"	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)

* Percentage of expected premium.

deviation was reduced for all policy types using the "selected" data, as would be expected because of the elimination of gross errors.

In conclusion, premiums paid for limited-pay 20, whole life, and paid-up at 65 policies were reported within 8 per cent of the expected value when gross errors were removed ("selected" data). Term policies were reported with most error and with least consistency of all policy types.

Educational Level

The average relative error of respondents with 12 or more years of education was compared with the error of those with less education to answer the question: "Do people with higher education give more valid responses regarding annual life insurance premiums than those with less education?"

The respondents were divided into two groups, those having high school education and those without high school education. The number of respondents with 12 or more years of education was

nearly twice the number with less than high school education. Further division of the families by educational level could not be justified because of the small number of cases.

The error, using all "workable" data (Table 7), was higher for those with less education than for those with more education in reporting premiums for whole life (-3% vs. -1%), for term (149% vs. 48%), and for paid-up at 65 policies (20% vs. 15%). In reporting premiums on limited-pay 20 policies the higher educated had an average relative error of 32 per cent compared with 11 per cent for the less educated.

Table 7. Average relative error* by educational level and by type of policy (all "workable" data).

Educational level	Number	Type of policy			
		Limited-pay 20	Whole life	Term	Paid-up at 65
Under 12	109	11 (n=59)	-3 (n=23)	149 (n=19)	20 (n= 8)
12 and over	200	32 (n=114)	-1 (n=48)	48 (n=20)	15 (n=18)
All	309	25 (n=173)	-1 (n=71)	97 (n=39)	17 (n=26)

* Percentage of expected premium.

The error, using the "selected" data (Table 8), indicated a mixed pattern by educational level. The average relative error for the less educated was higher for whole life (-10% vs.

-7%) and for term (38% vs. 15%), but lower for limited-pay 20 (1% vs. 4%). An error of 20 per cent was made by both groups in reporting premiums for paid-up at 65 policies, with the less educated overestimating and the more educated underestimating.

Table 8. Average relative error* by educational level and by type of policy ("selected" data).

Educational level	:	:	Type of policy			
			: Limited-	: Whole	: Term	: Paid-up
	Number:		pay 20	life		at 65
Under 12	87		1 (n=48)	-10 (n=22)	38 (n=12)	20 (n= 5)
12 and over	164		4 (n=91)	- 7 (n=43)	15 (n=18)	-20 (n=12)
All	251		3 (n=139)	- 8 (n=65)	24 (n=30)	- 8 (n=17)

* Percentage of expected premium.

The average deviation of relative error was determined as a measure of the consistency in response error to answer the question: "Are the higher educated as a group more consistent than the less educated in their response errors?"

The respondents with higher education were more consistent in the relative magnitude of their reporting error regarding whole life policies and less consistent in their report of limited-pay 20, term, and paid-up at 65 policies than the less educated. This may be seen in both Tables 9 and 10. It may also

Table 9. Average deviation of relative error* by educational level and by type of policy (all "workable" data).

Educational level	Number	Type of policy			
		Limited- pay 20	Whole life	Term	Paid-up at 65
Under 12	109	28 (n=59)	34 (n=23)	60 (n=19)	34 (n= 8)
12 and over	200	31 (n=114)	27 (n=48)	69 (n=20)	59 (n=18)
All	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)

* Percentage of expected premium.

Table 10. Average deviation of relative error* by educational level and by type of policy ("selected" data).

Educational level	Number	Type of policy			
		Limited- pay 20	Whole life	Term	Paid-up at 65
Under 12	87	13 (n=48)	28 (n=22)	40 (n=12)	11 (n= 5)
12 and over	164	16 (n=91)	19 (n=43)	47 (n=18)	22 (n=12)
All	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)

* Percentage of expected premium.

be observed that the average deviation in all cases is smaller in Table 10 than in 9, as should be expected because of the manner in which data of Table 10 were selected.

These data fail to support the position that more valid or more reliable data could be obtained from respondents of a higher educational level.

Age of Respondent

The average relative error of respondents under 45 years of age was compared with the error made by those 45 years and over to answer the question: "Do younger respondents give more valid answers to questions concerning life insurance premiums?"

The average relative error, using all "workable" data (Table 11), was found to be lower for respondents 45 years and over than the error of younger family heads in reporting premiums paid on whole life (4% vs. -7%) and limited-pay 20 policies (18% vs. 27%), but higher on term (166% vs. 39%) and paid-up at 65 policies (26% vs. 7%). Respondents of both age groups tended to over-estimate except whole life policyholders under 45 years of age.

Table 11. Average relative error* by age of respondent and by type of policy (all "workable" data).

Age of respondent	Number	Type of policy			
		Limited-pay 20	Whole life	Term	Paid-up at 65
Under 45	192	27 (n=123)	-7 (n=35)	39 (n=21)	7 (n=13)
45 and over	117	18 (n=50)	4 (n=36)	166 (n=18)	26 (n=13)
All	309	24 (n=173)	-1 (n=71)	97 (n=39)	17 (n=26)

* Percentage of expected premium.

Using the "selected" data (Table 12), the average relative error made by respondents 45 and over was less than that of younger respondents for whole life, for term, and for paid-up at 65, but equal for limited-pay 20 policies.

Table 12. Average relative error* by age of respondent and by type of policy ("selected" data).

Age of respondent	:	:	Type of policy			
			Limited-	Whole		Paid-up
	Number	:	pay 20	life	Term	at 65
Under 45	158		3 (n=96)	-9 (n=33)	27 (n=20)	-13 (n= 9)
45 and over	93		3 (n=43)	-7 (n=32)	19 (n=10)	- 3 (n= 8)
All	251		3 (n=139)	-8 (n=65)	24 (n=30)	- 8 (n=17)

* Percentage of expected premium.

The average deviation of relative error was calculated to answer the question: "Are respondents under 45 years of age more consistent in their response errors than those 45 and over?"

Respondents under 45 were generally more consistent in their errors than those 45 and over when using all "workable" data (Table 13). The only exception was in regard to limited-pay 20 policies in which case older respondents were more consistent than the younger family heads.

Elimination of extreme errors using the "selected" data (Table 14) reduced the average deviation in all cases. The error

Table 13. Average deviation of relative error* by age of respondent and by type of policy (all "workable" data).

Age of respondent	: Number	Type of policy			
		: Limited- pay 20	: Whole life	: Term	: Paid-up at 65
Under 45	192	33 (n=123)	26 (n=35)	49 (n=21)	48 (n=13)
45 and over	117	26 (n=50)	31 (n=36)	94 (n=18)	54 (n=13)
All	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)

* Percentage of expected premium.

Table 14. Average deviation of relative error* by age of respondent and by type of policy ("selected" data).

Age of respondent	: Number	Type of policy			
		: Limited- pay 20	: Whole life	: Term	: Paid-up at 65
Under 45	158	14 (n=96)	20 (n=33)	43 (n=20)	24 (n= 9)
45 and over	93	17 (n=43)	23 (n=32)	52 (n=10)	30 (n= 8)
All	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)

* Percentage of expected premium.

made by younger respondents was more consistent in magnitude than that made by those 45 years and over for all policy types.

There is no evidence for assuming a relationship exists between the age of the respondent and the validity of reports.

However, there is a suggestion that younger respondents are more consistent in their errors than older respondents.

Net Worth and Residence

The average relative error of respondents holding low net worth was compared with the error made by those of high net worth to answer the question: "Do respondents having high net worth tend to give more valid answers to life insurance questions than low net worth respondents?"

Net worth holdings of all respondents (200 families) ranged from a low of -\$4,100 to a high of \$199,303. Net worth was classified as "high" or "low" so as to divide the policyholders into equal sized groups. Classifications were based upon those set up by Rogers (1962) (non-farm), and Diehl (1962).

Net worth for farm families was considered low if it was less than \$28,000, and high if it was \$28,000 or more. Net worth for non-farm families was considered low if it was less than \$8,250, and high if it was \$8,250 or over. Justification for a different high and low net worth level for farm than for non-farm lies in the fact that a greater amount of investment is required for farm operation than for "city" occupations.

Families of low net worth reported premiums with less relative error than families of high net worth in all cases except non-farm high net worth reporters of term and paid-up at 65 policies when all "workable" data were analyzed (Table 15). The range of error was great in both low (-18% to 147%) and high net worth (-68% to 169%) groups. The error was less for non-farm

Table 15. Average relative error* by net worth for farm and non-farm families and by type of policy (all "workable" data).

		Type of policy							
		Limited-pay 20		Whole life		Term		Paid-up at 65	
Net worth:	Num-ber	Farm ¹	Non-farm ²	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
Low	112	-1 (n=33)	18 (n=33)	-2 (n= 8)	0** (n=13)	147 (n= 9)	-18 (n= 6)	21 (n=2)	35 (n= 9)
High	197	18 (n=30)	40 (n=77)	-4 (n= 8)	-1 (n=42)	169 (n=16)	-15 (n= 8)	-68 (n=2)	16 (n=13)
All	309	8 (n=63)	34 (n=110)	-3 (n=16)	-1 (n=55)	161 (n=25)	-16 (n=14)	-24 (n=4)	24 (n=22)

* Percentage of expected premium.

** Less than .5%.

¹ Net worth divisions for farm families: low, less than \$28,000; high, \$28,000 or more.

² Net worth divisions for non-farm families: low, less than \$8,250; high, \$8,250 or more.

families than farm families reporting premiums for whole life and term policies, and lower for farm families with limited-pay 20 policies. Paid-up at 65 policies indicated a mixed pattern of error by place of residence and net worth.

Analysis of the "selected" data (Table 16) revealed an increase in the tendency to underestimate. Non-farm families of low net worth underestimated premiums paid for all policies, while farm families underestimated whole life and paid-up at 65 policy premiums and overestimated premiums on limited-pay 20 and term policies. Average relative error of high net worth farm and non-farm families was similar for limited-pay 20 (4% and 4%)

Table 16. Average relative error* by net worth for farm and non-farm families and by type of policy ("selected" data).

		Type of policy							
		Limited-		Whole				Paid-up	
		pay 20		life		Term		at 65	
Net worth:	Num-ber	: Farm1:	Non-farm2:	: Farm	: Non-farm	: Farm	: Non-farm	: Farm	: Non-farm
Low	92	7 (n=27)	-3 (n=27)	-2 (n= 8)	-20 (n=11)	60 (n= 7)	-18 (n= 6)	-15 (n=1)	-13 (n= 6)
High	159	4 (n=25)	4 (n=60)	-4 (n= 8)	- 6 (n=38)	60 (n= 9)	-15 (n= 8)	-65 (n=1)	2 (n= 9)
All	251	5 (n=52)	2 (n=87)	-3 (n=16)	-10 (n=49)	60 (n=16)	-16 (n=14)	-40 (n=2)	- 4 (n=15)

* Percentage of expected premium.

¹ Net worth divisions for farm families: low, less than \$28,000; high, \$28,000 or more.

² Net worth divisions for non-farm families: low, less than \$8,250; high, \$8,250 or more.

and whole life policies (-4% and -6%). Term and paid-up at 65 policy premiums were reported with greater error by farm families than by non-farm families of high net worth.

The average deviation of relative error was calculated to answer the question: "Are policyholders having high net worth more consistent in their response errors than those having low net worth?"

Respondents with high net worth were more consistent as a group in the average relative errors on all policies except term policies when using all "workable" data (Table 17). Non-farm families were less consistent than farm families for all types of policies except term.

Table 17. Average deviation of relative error* by net worth for farm and non-farm families and by type of policy (all "workable" data).

		Type of policy							
		Limited-pay 20		Whole life		Term		Paid-up at 65	
Net worth:	Num-ber	Farm1	Non-farm2	Farm	Non-farm	Farm	Non-farm	Farm	Non-farm
Low	112	24 (n=33)	34 (n=33)	28 (n= 8)	38 (n=13)	46 (n= 9)	25 (n= 6)	36 (n=2)	66 (n= 9)
High	197	21 (n=30)	32 (n=77)	11 (n= 8)	31 (n=42)	49 (n=16)	26 (n= 8)	0 (n=2)	42 (n=13)
All	309	23 (n=63)	34 (n=110)	20 (n=16)	32 (n=55)	48 (n=25)	26 (n=14)	40 (n=4)	49 (n=22)

* Percentage of expected premium.

1 Net worth divisions for farm families: low, less than \$28,000; high \$28,000 or more.

2 Net worth divisions for non-farm families: low, less than \$8,250; high, \$8,250 or more.

Low net worth families were more consistent in the size of their errors than families of high net worth using the "selected" data (Table 18), except for errors on whole life policies which showed high net worth farm families more consistent than low net worth families. Due to only one unit in each low and high net worth farm groups reporting paid-up at 65 policies, the average deviation of the relative error was zero.

Based on the data, it is doubtful whether net worth status of families is related to the validity with which survey questions were answered. Low net worth families were more consistent in the magnitude of their errors than high net worth respondents

Table 18. Average deviation of relative error* by net worth for farm and non-farm families and by type of policy ("selected" data).

		Type of policy							
		Limited-pay 20		Whole life		Term		Paid-up at 65	
Net worth:	Num-ber	Farm1	farm2	Farm	farm	Farm	farm	Farm	farm
		Non-	Non-	Non-	Non-	Non-	Non-	Non-	Non-
Low	92	9 (n=27)	15 (n=27)	28 (n= 8)	16 (n=11)	34 (n= 7)	25 (n= 6)	0 (n=1)	19 (n= 6)
High	159	13 (n=25)	17 (n=60)	11 (n= 8)	23 (n=38)	39 (n= 9)	26 (n= 8)	0 (n=1)	27 (n= 9)
All	251	11 (n=52)	17 (n=87)	20 (n=16)	22 (n=49)	37 (n=16)	26 (n=14)	0 (n=2)	27 (n=15)

* Percentage of expected premium.

¹ Net worth divisions for farm families: low, less than \$28,000; high, \$28,000 or more.

² Net worth divisions for non-farm families: low, less than \$8,250; high, \$8,250 or more.

("selected" data), although in most cases the difference was not great enough to justify declaration of a definite trend.

Face Value

The average relative error of respondents holding policies of high face value was compared with that of respondents holding policies of low face value in order to answer the question: "Do respondents give more valid answers to life insurance questions regarding policies of high face value than policies of low face value?"

Life insurance policies were divided into two groups, those having face value of \$1,500 or less and those having face value over \$1,500. Division into more groups would have resulted in too few numbers per group.

Respondents with lower face value policies overestimated premiums for all policy types (Table 19). The average relative error was greater on premiums reported as paid for lower face value policies than higher face value policies on all types of policies except whole life.

Table 19. Average relative error* by face value and by type of policy (all "workable" data).

Face value	:	:	Type of policy			
			: Limited-	: Whole	:	: Paid-up
	: Number:	: pay 20	: life	: Term	: at 65	
\$1,500 or less	176	35 (n=115)	12 (n=36)	173 (n=14)	46 (n=11)	
Over \$1,500	133	2 (n=58)	-15 (n=35)	55 (n=25)	- 5 (n=15)	
All	309	24 (n=173)	- 1 (n=71)	97 (n=39)	17 (n=26)	

* Percentage of expected premium.

Policyholders reported premiums paid for limited-pay 20 policies of higher face value with an average relative error of less than 1 per cent, using the "selected" data (Table 20). Low face value whole life policies showed only a 2 per cent error. An increase in the amount of underestimation on higher face value whole life and paid-up at 65 policies resulted when extreme errors in estimation were eliminated.

Table 20. Average relative error* by face value and by type of policy ("selected" data).

Face value	:	:	Type of policy				: Paid-up
			: Limited-	: Whole	: life	: Term	
		: Number:	pay 20	: life			: at 65
\$1,500 or less	138		5 (n=91)	2 (n=32)		43 (n= 8)	12 (n= 7)
Over \$1,500	113		0** (n=48)	-18 (n=33)		18 (n=22)	-23 (n=10)
All	251		3 (n=139)	- 8 (n=65)		24 (n=30)	- 8 (n=17)

* Percentage of expected premium.

** Less than 1%.

The average deviation of relative error was determined as a measure of the range in error to answer the question: "Do respondents tend to be more consistent in errors made when reporting information on policies of high face value than on policies of low face value?"

Respondents were more consistent in errors made on whole life and term policies of high face value than on low face value policies when all "workable" data were analyzed (Table 21). The difference in error was slight between limited-pay 20 and whole life policies of low and high face value.

A mixed pattern resulted when using the "selected" data (Table 22). Errors were more consistent on low face value limited-pay 20 (12% vs. 19%) and paid-up at 65 policies (19% vs. 26%), but less consistent on whole life (21% vs. 19%) and term policies (65% vs. 40%).

Table 21. Average deviation of relative error* by face value and by type of policy (all "workable" data).

Face value	:	:	Type of policy			:Paid-up
			: Limited-	: Whole	:	
	:Number:	pay 20	life	Term	: at 65	
\$1,500 or less	176	27 (n=115)	28 (n=36)	93 (n=14)	31 (n=11)	
Over \$1,500	133	29 (n=58)	25 (n=35)	59 (n=25)	54 (n=15)	
All	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)	

* Percentage of expected premium.

Table 22. Average deviation of relative error* by face value and by type of policy ("selected" data).

Face value	:	:	Type of policy			
			Limited-	Whole		Paid-up
	Number:	pay 20	life	Term	at 65	
\$1,500 or less	138	12 (n=91)	21 (n=32)	65 (n= 8)	19 (n= 7)	
Over \$1,500	113	19 (n=48)	19 (n=33)	40 (n=22)	26 (n=10)	
All	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)	

* Percentage of expected premium.

The mixed results indicate little, if any, relationship between policy face value, validity of the information, and consistency of the magnitude of the errors in respondent reports.

Year of Purchase

Policies were sorted by year of purchase into two groups, those purchased during 1950 or before and those purchased after 1950. The average relative error resulting from the groups was determined to answer the question: "Is recency of purchase a factor which influences the validity of reports of life insurance premiums?"

The average relative error, using all "workable" data (Table 23) was lower for policies purchased after 1950, than those purchased during or before 1950 on whole life (1% vs. -2%) and term policies (33% vs. 153%), but higher on limited-pay 20 (38% vs. 11%) and paid-up at 65 policies (81% vs. -7%).

Table 23. Average relative error* by when policy was purchased and by type of policy (all "workable" data).

Year purchased	Number	Type of policy			
		Limited-pay 20	Whole life	Term	Paid-up at 65
1950 or before	177	11 (n=87)	-2 (n=50)	153 (n=21)	- 7 (n=19)
After 1950	132	38 (n=86)	1 (n=21)	33 (n=18)	81 (n= 7)
All	309	24 (n=173)	- 1 (n=71)	97 (n=39)	17 (n=26)

* Percentage of expected premium.

Using the "selected" data (Table 24) respondents of both groups underestimated premiums for whole life and paid-up at 65

Table 24. Average relative error* by when policy was purchased and by type of policy ("selected" data).

Year purchased	Number	Type of policy			
		Limited-pay 20	Whole life	Term	Paid-up at 65
1950 or before	149	2 (n=73)	- 7 (n=48)	43 (n=13)	- 7 (n=15)
After 1950	102	4 (n=66)	-10 (n=17)	10 (n=17)	-21 (n= 2)
All	251	3 (n=139)	- 8 (n=65)	24 (n=30)	- 8 (n=17)

* Percentage of expected premium.

policies, but overestimated premiums on limited-pay 20 and term policies. The difference between classes for limited-pay 20 and for whole life policies was slight.

The average deviation of relative error was determined as a measure of the range in response error to answer the question: "Are respondents' errors more consistent on policies purchased after 1950 than on policies purchased during 1950 or before?"

Respondents reporting premiums for policies purchased during 1950 or before were more consistent in their errors on all types of policies than those reporting on policies purchased after 1950 when all "workable" data were analyzed (Table 25).

Using the "selected" data (Table 26) the average deviation of relative error was lower for whole life (13% vs. 24%) and for paid-up at 65 (0% vs. 30%), but higher for limited-pay 20 (16% vs. 13%) and for term policies (45% vs. 35%) purchased during 1950 or before.

Table 25. Average deviation of relative error* by when policy was purchased and by type of policy (all "workable" data).

Year purchased	: Number :	Type of policy			
		: Limited- : pay 20 :	Whole : life :	Term :	: Paid-up : at 65
1950 or before	177	23 (n=87)	29 (n=50)	42 (n=21)	38 (n=19)
After 1950	132	37 (n=86)	32 (n=21)	65 (n=18)	58 (n= 7)
All	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)

* Percentage of expected premium.

Table 26. Average deviation of relative error* by when policy was purchased and by type of policy ("selected" data).

Year purchased	: Number :	Type of policy			
		: Limited- : pay 20 :	Whole : life :	Term :	: Paid-up : at 65
1950 or before	149	13 (n=73)	24 (n=48)	35 (n=13)	30 (n=15)
After 1950	102	16 (n=66)	13 (n=17)	45 (n=17)	0 (n= 2)
All	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)

* Percentage of expected premium.

No definite relation is evident regarding the validity of premium reports or the consistency in errors by recency of policy purchases.

Table 25. Average deviation of relative error* by when policy was purchased and by type of policy (all "workable" data).

Year purchased	: Number :	Type of policy			
		: Limited- : pay 20 :	Whole : life :	Term :	: Paid-up : at 65
1950 or before	177	25 (n=87)	29 (n=50)	42 (n=21)	38 (n=19)
After 1950	132	37 (n=86)	32 (n=21)	65 (n=18)	58 (n= 7)
All	309	31 (n=173)	30 (n=71)	77 (n=39)	52 (n=26)

* Percentage of expected premium.

Table 26. Average deviation of relative error* by when policy was purchased and by type of policy ("selected" data).

Year purchased	: Number :	Type of policy			
		: Limited- : pay 20 :	Whole : life :	Term :	: Paid-up : at 65
1950 or before	149	13 (n=73)	24 (n=48)	35 (n=13)	30 (n=15)
After 1950	102	16 (n=66)	13 (n=17)	45 (n=17)	0 (n= 2)
All	251	15 (n=139)	22 (n=65)	46 (n=30)	28 (n=17)

* Percentage of expected premium.

No definite relation is evident regarding the validity of premium reports or the consistency in errors by recency of policy purchases.

Results Compared

The average relative errors and average deviation of errors were compared with the overall errors and deviations to determine how the error varied between groups and all respondents. Comparisons were based on "selected" data as these were considered by the writer to be more informative than all "workable" data.

Respondents of higher educational level, greater net worth, who are farm residents, are older, and who had higher face value policies purchased more recently might be expected to give more valid answers to survey questions. If this were true, the relative error for these classifications would be closer to zero (no error) than the average for all respondents reporting a particular type of policy. To highlight this, Table 27 was constructed, showing the relative errors of the groups which supposedly would have a lower relative error. The evidence indicated no support for this position. In fact, less than half of the classifications had lower relative error than the average error by respondents of the particular policy type.

Likewise, respondents of higher educational level, greater net worth, who are farm residents, are older, or who had higher face value policies purchased more recently might be expected to be more consistent in their errors than the average of all respondents. To show this, Table 28 was constructed, tabulating the deviations of each of the groups which supposedly would be more consistent in their errors. Evidence supporting this

position was lacking.

Table 27. Average relative error* by classification and by type of policy ("selected" data).

Classification	Type of policy			
	: Limited- : pay 20	: Whole : life	: Term	: Paid-up : at 65
All	3	- 8	24	- 8
Educational level (12 and over)	4	<u>- 7</u>	<u>15</u>	-20
Age of respondent (45 and over)	3	<u>- 7</u>	<u>19</u>	<u>- 3</u>
Net worth (high)				
Farm	4	<u>- 4</u>	60	-65
Non-farm	4	- 6	<u>-15</u>	<u>2</u>
Residence (farm)	5	<u>- 3</u>	60	-40
Face value (over \$1,500)	<u>0**</u>	-18	<u>18</u>	-23
Year purchased (after 1950)	4	-10	<u>10</u>	-21

* Percentage of expected premium.

** Less than 1%.

— Less relative error than the average for all.

Table 28. Average deviation of relative errors* by classification and by type of policy ("selected" data).

Classification	Type of policy			
	: Limited- : pay 20	: Whole : life	: Term	: Paid-up : at 65
All	15	22	46	28
Educational level (12 and over)	16	<u>19</u>	47	<u>22</u>
Age of respondent (45 and over)	17	23	52	30
Net worth (high)				
Farm	<u>13</u>	<u>11</u>	<u>39</u>	<u>0</u>
Non-farm	17	23	<u>26</u>	<u>27</u>
Residence (farm)	<u>11</u>	<u>20</u>	<u>37</u>	<u>0</u>
Face value (over \$1,500)	19	<u>19</u>	<u>40</u>	<u>26</u>
Year purchased (after 1950)	16	<u>13</u>	<u>45</u>	<u>0</u>

* Percentage of expected premium.

— Less deviation of relative error than the average for all.

The "selected" data provided no basis for concluding that respondents with the selected socio-economic characteristics would answer life insurance survey questions with greater validity or reliability than the average of all policyholders. The type of policy on which reports were made indicated a greater source of confusion than the socio-economic characteristics of policyholders.

Another way of showing the difference in the relative errors within socio-economic classes is to tabulate the absolute difference in relative errors between the two classes within groups. For example, the difference in average relative error between the more educated respondents and those with less education was 4 per cent minus 1 per cent or 3 per cent (refer to Table 8). The differences are presented in Table 29. The least difference possible within any group was zero which indicates no difference in the amount of relative error.

Table 29. Differences in average relative errors* within groups by type of policy, sign not considered ("selected" data).

Group	Type of policy			
	Limited- pay 20	Whole life	Term	Paid-up at 65
All	0	0	0	0
Educational level	3	3	23	40
Age of respondent	0	2	8	10
Net worth				
Farm	3	2	0	50
Non-farm	7	14	3	15
Residence	3	7	76	36
Face value	5	20	25	35
Year of purchase	2	3	33	14

* Percentage of expected premium.

The range of difference in errors within groups was least when policies were sorted by age of respondent (from 0% to 10%), while the difference was greatest when data were sorted by place of residence (from 3% to 76%). Differences in the average relative errors made in reporting term and paid-up at 65 policies were more erratic than reports for limited-pay 20 and whole life policies.

To obtain a measure of the difference in the consistency of relative errors within groups, the differences in the average deviations were tabulated. For example, the difference in average deviations of relative errors between the more educated respondent and the less educated is 16 per cent minus 13 per cent or 3 per cent (refer to Table 10). These differences are presented in Table 30. The least difference in average deviation possible was zero, which indicates an equal amount of deviation between classes within a group.

The range of difference was least by age of respondent (from 3% to 9%) and greatest by year of purchase (from 3% to 30%). More erratic differences were evident by policy type than within groups of policyholders. Limited-pay 20 policies showed a narrower range than other policy types studied.

Both in regard to amount of relative error and consistency of the relative errors, a stronger association was indicated between reporting error and the type of policy than between error and socio-economic characteristics of policyholders.

Table 30. Differences in average deviation of relative errors* within groups by type of policy ("selected" data).

Group	Type of policy			
	: Limited- : pay 20	: Whole : life	: Term	: Paid-up : at 65
All	0	0	0	0
Educational level	3	9	7	11
Age of respondent	3	3	9	6
Net worth				
Farm	4	17	5	0
Non-farm	2	7	1	8
Residence	6	2	11	27
Face value	7	2	25	7
Year of purchase	3	11	10	30

* Percentage of expected premium.

SUMMARY AND CONCLUSIONS

This study is concerned with the validity and reliability of life insurance data gathered by personal interview survey. The specific objectives were: (1) to estimate the discrepancy between life insurance premium values as reported by respondents and as derived from published rate tables, and (2) to estimate the variation in discrepancy by education and age of respondent, net worth and place of residence (farm or non-farm) of the family, and face value and year of purchase of the policy.

Response errors affect the validity and reliability of the survey. The data used in this study were particularly vulnerable

because information was given by memory-recall method and not by examination of policies by the interviewers. Several methods for measuring response error have been employed; the method developed for this study involved comparing reported premiums paid with the expected value determined from published rate tables. The resulting difference was expressed as a percentage of the rate table premium, and referred to as the relative error. This constituted the measure of validity. The consistency of this error within groups was measured by computing the average deviation and constituted, for purposes of this study, the measure of reliability.

This method of validation has certain recognized limitations. The correctness of an expected premium, as determined from rate tables, depends upon the correctness of the respondent's reported age at purchase, face value, type of policy, and the way in which dividends were treated. Such incorrect information may result in appreciable error which could not be corrected without going beyond the scope of this study. Discrepancies due to these and other limitations were minimized by eliminating policies which showed extreme errors in reported premiums. The resulting "selected" data were considered by the writer to be more useful for purposes of this study. Although both sets of data, all "workable" and "selected" data, are presented in the text for the reader's use, only the results based on "selected" data are discussed in this concluding section.

With respect to overall results, the error was low (within 8%) for all policy types studied, except term policies for which

the error was 24 per cent. Term policies also revealed the greatest deviation in relative errors. The low relative error for policies other than term suggests a recommendation for future studies. If the objective of a subsequent study is to estimate premiums paid by a group of families, the group average would give a reasonable estimate, especially if reports showing gross errors were eliminated. On the other hand, if the objective is to estimate life insurance premiums paid by individuals, these estimates might be accurately and economically determined by direct referral to published rate tables, concentrating survey efforts to reduce reporting error on type and face value of the policy, and age at purchase of the policyholder.

The error, assessed in relation to educational level, age, net worth, or residence (farm or non-farm) of the policyholder, or to face value or year of purchase of the policy, provided no basis for claiming a relationship between these factors and the error. Errors varied more, both in amount and in consistency, by types of policies than by socio-economic characteristics of policyholders. There was undoubtedly a lack of knowledge on the part of many policyholders about their life insurance policies, but no simple explanation, such as educational or maturity level, can be cited as the source of errors.

Therefore, as a suggestion for reinforcing previously made recommendations, in future studies of a similar nature it might be advisable for the interviewer to check personally the respondents' life insurance policies. The interviewer might ask

detailed questions to help the respondent recall information or ask self validating questions as a means of checking information given by the respondent. More valid information might be obtained, per dollar cost, if survey questions were concentrated on finding out what policies people have rather than how much they pay for life insurance coverage.

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APPENDIX

CONFIDENTIAL

Family Schedule Number _____

Date _____

County _____

Township or Town _____

Time began _____

Time ended _____

Interviewer _____

SURVEY OF FAMILY FINANCIAL SECURITY:
EDUCATION AND INSURANCE
Summer 1960

(CONFIDENTIAL)

KANSAS STATE UNIVERSITY
AGRICULTURAL EXPERIMENT STATION
Project 427*

*A contributing project to
North Central Regional Research
Project NC-32

Department of Family Economics
Justin Hall
Kansas State University
Manhattan, Kansas

INTRODUCTION

As an Experiment Station research project the Department of Family Economics at Kansas State University is conducting a survey to learn something about the attitudes of families toward life insurance and education as means of providing financial security for a family.

They feel that the best way to get this information is to talk directly with the people themselves.

Eight counties in Kansas have been chosen in which to make the survey, and your family is one of 220 families selected at random to be part of the survey.

I. ATTITUDE TOWARD PLANNING

I would like to ask first some general questions about your plans in the event of death or disability in your family:

1. Has there been discussion in your family as to what it would do for financial support in event of the death of the husband?
 - a. Little or none? _____
 - b. Considered the matter, but have not reached a definite decision? _____
 - c. Have developed fairly definite plans? _____
2. Has there been discussion in your family as to what it would do for financial support in event of husband's permanent disability?
 - a. Little or none? _____
 - b. Considered the matter, but have not reached a definite decision? _____
 - c. Have developed fairly definite plans? _____
3. Has there been discussion in your family as to what it would do for financial support in event of the death of the wife?
 - a. Little or none? _____
 - b. Considered the matter, but have not reached a definite decision? _____
 - c. Have developed fairly definite plans? _____
4. Has there been discussion in your family as to what it would do for financial support in event of wife's permanent disability?
 - a. Little or none? _____
 - b. Considered the matter, but have not reached a definite decision? _____
 - c. Have developed fairly definite plans? _____
5. If you have indicated plans above, what are the basic elements of your plans? That is, what are you counting on in case of need?
 - a. _____
 - b. _____
 - c. _____

II. ATTITUDE TOWARD INSURANCE

One of the things we want to find out is how people like yourself feel about life insurance.

6. What would you say are the major reasons for carrying life insurance?

- a. _____
- b. _____
- c. _____

7. Can you think of any other reasons?

- a. _____
- b. _____

8. Here are some of the reasons people have given when asked why the head of a family should carry life insurance. Please indicate which of these reasons are of great importance to you, which are less important, and which are not important at all to you.

	Great Importance	Less Important	Not Important
a. To pay bills, debts, burial expenses in case of death.	_____	_____	_____
b. To provide support for dependents in case of death.	_____	_____	_____
c. To have a good method of saving money.	_____	_____	_____
d. To enable you to borrow in an emergency.	_____	_____	_____
e. To provide funds for the education of children.	_____	_____	_____
f. To pay off mortgage in case of death.	_____	_____	_____
g. To provide income for old age.	_____	_____	_____
h. Others. _____	_____	_____	_____

9. What would you say are the major reasons for not carrying life insurance?

- a. _____
- b. _____
- c. _____

10. Can you think of any other reasons?

- a. _____
- b. _____

11. Here are some reasons people have given when asked why the head of the family should not carry life insurance. Do you agree with them?

	Agree (yes)	Disagree (no)	No opinion
a. Prefer other ways to take care of debts, bills, and burial expenses in case of death.	_____	_____	_____
b. Prefer other ways to provide support of dependents in case of death.	_____	_____	_____
c. Prefer other methods of saving money.	_____	_____	_____
d. Prefer other types of savings and credit to meet emergencies.	_____	_____	_____
e. Prefer other ways of providing for education of children.	_____	_____	_____
f. Prefer other arrangements to pay off mortgage in case of death.	_____	_____	_____
g. Prefer other ways of providing income for old age.	_____	_____	_____
h. Premiums are too high.	_____	_____	_____
i. Don't believe in life insurance.	_____	_____	_____
j. Others. _____	_____	_____	_____

12. We would like information about your family and its composition.												13. Insurance			
Number of years married		Sex : M or F	Age : last birth-day	d. Highest : grade of school completed	Marital status or relation- ship	Family Support : ½ or more	War : Vet-eran	What was each person doing most of last year? (Occupation)	Payments on SS or plan	Number of policies of current plan	Number of policies held formerly	Do you plan to add more insurance in the next five years			
a.	b.	c.	d.	e.	f.	g.	h.	i.	a.	b.	c.	d.			
Husband															
Wife															
Dependents-children:															
1.															
2.															
3.															
4.															
5.															
6.															
7.															
8.															
9.															
10.															
others:															
1.															
2.															
3.															

When purchased	Policy status	Type of Policy	Face Value	Last premium (Cur pol)	How often	Annual Premium	Dividends last year	Cash or loan value	Type or Name of Company	Why was this policy purchased? What were the circumstances at the time you purchased it?
Year or age	Cur Lap Dtp Mat	T WL LP END GR OTHER			A SA Q M	No Yes Amt. DK			OR CL/SL ASST VA BUR FR	Circumstance: Planned finances Anticipated event Event prompted Generally good idea
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.	k.
1.										
2.										
3.										
4.										
5.										

Does this include all the insurance you have ever carried on this person? Does it include lapsed and matured policies?

15 a. Do you have additional life insurance to cover a specific debt or mortgage, such as installment credit, car purchase, home mortgage, credit union loan, other loans? ☒ Yes ☐ No b. If yes, include above.

16 a. Have you ever had such coverage? ☒ Yes ☐ No b. When?

17. Do you think you will be able to continue these policies? ☒ Yes ☐ No 18. If no, which policies will you not continue? Nos. Why not?

19. Do you plan to continue these policies? ☒ Yes ☐ No

20. If no, why not?

V. FAMILY LIFE INSURANCE COVERAGE

Complete a "policy sheet" for each dependent, currently or formerly insured.
Number of sheets completed _____.

21. Are there persons other than those listed in question 12 on whom you have carried insurance? ☐ Yes ☐ No
22. Have you or members of your family ever been a beneficiary of a life insurance policy and actually received payment? ☐ Yes ☐ No
23. a. Are there particular reasons why you do not carry life insurance on members of your family who are not insured? ☐ Yes ☐ No ☐ Not Apply
- b. What are they? _____

24. We are interested in knowing how people feel about their insurance protection. Do you feel you people are carrying the "right" amount of life insurance for you, or is it "more" than you feel you need, or "less"? ☐ R ☐ M ☐ L
25. Why do you feel that way? _____

In some families the wife and children have life insurance and in some they do not. For a family with two young children, how important do you think it is to carry life insurance on the life of. . . .

Very important	Somewhat important	Not important	Do not know
-------------------	-----------------------	------------------	----------------

- | | | | | |
|---------------------------|-------|-------|-------|-------|
| 26. The wife. | _____ | _____ | _____ | _____ |
| 27. The children. | _____ | _____ | _____ | _____ |
28. Would you consider carrying a life insurance policy which, like auto and fire insurance, pays nothing unless you suffer a loss? I am referring to a type of policy in which you get nothing—just your estate or dependents are beneficiaries in case of your death. ☐ Yes ☐ No ☐ Don't know
29. Why? _____

VI. OTHER INSURANCE

We are also interested in other forms of insurance carried by your family:

		: yes :		: loss ever
		: no :		: experienced?
Do you carry insurance		: don't:	If no, why not?	: Yes No
on:		: own :		
30. Your automobile or truck?				
a. Liability	_____	_____	_____	_____
b. Collision	_____	_____	_____	_____
31. Your home?				
a. Fire	_____	_____	_____	_____
b. Extended coverage	_____	_____	_____	_____
32. Your household goods?				
a. Fire	_____	_____	_____	_____
b. Extended coverage	_____	_____	_____	_____
c. Theft	_____	_____	_____	_____
33. Farm—crops?				
a. Hail damage	_____	_____	_____	_____
b. Theft	_____	_____	_____	_____
34. Farm buildings?				
a. Fire	_____	_____	_____	_____
b. Extended coverage	_____	_____	_____	_____
35. Personal liability—for accidents on property, of employees or guests?	_____	_____	_____	_____
36. Health insurance:				
a. Blue cross (hospital)	_____	_____	_____	_____
b. Blue shield (surgical)	_____	_____	_____	_____
c. Health and accident (commercial)	_____	_____	_____	_____
d. Major medical	_____	_____	_____	_____
e. Others	_____	_____	_____	_____
37. Personal property floater?	_____	_____	_____	_____
38. Others:				
a. Livestock	_____	_____	_____	_____
b. _____	_____	_____	_____	_____

VII. EDUCATION PLANS

- A. For families with
- children in college
- full or part time? (If none, skip to B.)

Name	Month and year entered	Major fields of study	College or University	How is education being paid for? (l. s. w.p.g.)
39.	40.	41.	42.	43.

44. Do you feel that a college education should be encouraged as much for girls as for boys?
- ☐
- Yes
- ☐
- No
- ☐
- No opinion

b. Why? _____

45. a. Is it equally important for girls to graduate from college?

☐ Yes ☐ No ☐ No opinion

b. Why? _____

46. In what different ways do you think a college education is worth the cost?

- B. For families with children of pre-college age: (If none, skip to C.)
-
- (If children have dropped out of school, rephrase to ask about high school rather than college.)

47. Do you feel high school graduates should be encouraged to continue their education beyond high school?
- ☐
- Yes
- ☐
- No
- ☐
- No opinion

48. If no, why not? _____

49. a. If yes, what are the plans for education? _____

b. Why? _____

c. How would their education be financed? _____

50. a. Would your answer different for boys than for girls?

☐ Yes ☐ No ☐ No opinion

b. If yes, in what way: _____

51. If any of the children expect to go to college in the next three years, when do they intend to go? (Enter information in Table A.)

C. For families with dependent children six years of age and over not in school:
(If none, skip to D.)

Name _____

Last grade completed _____

When completed _____

52. Why didn't _____ go on in school? (Major reason.)

a. Graduated _____

b. Needed at home _____

c. Lost interest _____

d. Military service _____

e. No desire _____

f. Illness _____

g. Temporarily out _____

D. Ask of all families:

53. Do you feel that a college education would be of more value to a young person now than when you were going to school?

☐ Yes

☐ No

☐ No opinion

54. Do you feel that education has any relation to the financial security of a family?

☐ Yes

☐ No

☐ No opinion

55. In what ways? _____

56. If yes, over the life of an individual, how much do you think a man with a college degree would make over one without one?

\$ _____

57. What type of education do you feel prepares a boy or a girl best for the future?
(Check one.)

a. Boy

b. Girl

_____	Nursing.	_____
_____	Business training, like salesmanship.	_____
_____	Engineering.	_____
_____	Home economics.	_____
_____	Basic training in mathematics, science, etc.	_____
_____	Education.	_____
_____	Physics and chemistry.	_____
_____	Government and law.	_____
_____	Medicine.	_____
_____	Literature and the fine arts.	_____
_____	Economics and social studies	_____
_____	Languages.	_____
_____	Agricultural.	_____
_____	Others.	_____

- c. If you were to start over, which would you pick?

Husband _____

Wife _____

- d. Why? _____

VIII. ECONOMIC STATUS—INCOME AND SOURCES

Insurance is a contract to pay money in the event that the risk insured against occurs. Insurance premiums require sufficient regular income to continue payments.

58. So that we might relate your insurance program to income, would you check the income class which best represents your total net income last year?

<u>Loss</u>	a. - \$5,501 or more	h. + \$ 501 to 1,500	<u>Gain</u>
	b. - 4,501 to 5,500	i. + 1,501 to 2,500	
	c. - 3,501 to 4,500	j. + 2,501 to 3,500	
	d. - 2,501 to 3,500	k. + 3,501 to 4,500	
	e. - 1,501 to 2,500	l. + 4,501 to 5,500	
	f. - 501 to 1,500	m. + 5,501 to 6,500	
Even —	g. - \$ 500 to + 500	n. + 6,501 to 7,500	
		o. + 7,501 to 8,500	
		p. + 8,501 to 9,500	
		q. + 9,501 to 10,500	
		r. + 10,501 to 13,000	
		s. + 13,001 to 15,500	
		t. + 15,501 to 20,500	
		u. + 20,501 and more	

Source	1959 income received by:		
	Husband	Wife	Children
59. Farming: (Net income from operating farm)	\$	\$	\$
60. Leases and rents:			
a. Oil and gas			
b. Rent farm			
c. Rooms and real estate			
61. Labor:			
a. Farm work			
b. Other			
62. Investments:			
a. Interest			
b. Dividends			
63. Business—self employed			
64. Government payments:			
a. VA			
b. Social security			
65. Teaching, nursing, and other professions			
66. Others			
TOTALS			
	67.	68.	69.

70. How much of this income can you count on regularly each year? \$

IX. FINANCIAL STATUS—NET WORTH

One's insurance program needs to be related to the value of his holdings as well as his income. That is, life insurance is income-replacement, but it is also a way of covering debts and obligations in case of death or disability. Also your investments are a form of self insurance.

With your assistance I should like to draw up a picture of your financial position which will help us evaluate your insurance program.

	What do you have? (dollars)	What do you owe? (dollars)
Business or farm?		
Land and improvements	\$ _____	\$ _____
Farm machinery	\$ _____	\$ _____
Livestock	\$ _____	\$ _____
Crops and grain in storage	\$ _____	\$ _____
Others	\$ _____	\$ _____
Home	\$ _____	\$ _____
Other real estate	\$ _____	\$ _____
Automobile and/or truck	\$ _____	\$ _____
Household furnishings and appliances	\$ _____	\$ _____
Savings and investments:		
Government bonds	\$ _____	
Corporate stocks and bonds	\$ _____	
Bank accounts (S & L)	\$ _____	\$ _____
Savings and Loans (S & L)	\$ _____	\$ _____
Co-op share	\$ _____	
Producers Credit Administration	\$ _____	\$ _____
Cash value of life insurance policies	\$ _____	\$ _____
Others:		
Hospital and medical bills		\$ _____
Other bills		\$ _____
Small loans and Credit union	\$ _____	\$ _____
TOTAL	71. \$ _____	72. \$ _____
NET WORTH		73. \$ _____

X. EVALUATION

With this information before us, let us return to an evaluation of the insurance program.

74. What provision is made for retirement? _____
75. Estimated cost \$ _____ per mo. needed in retirement.
76. What provision is made for the education of children? _____

77. Estimated cost of attending college \$ _____ per yr.
78. Total estimated cost for educating your family beyond high school \$ _____.
79. What provision is made to cover a burial expense? _____

80. Estimated cost of a burial \$ _____ per burial.
81. What provision is made to cover medical and other expenses that might be left following death?

82. What provision is made for the care of the surviving husband?

83. What provision is made for the care of the surviving wife?

84. What provision is made for the surviving children?

Few families can cover all the many possible losses that might occur. Fortunately, in only the more tragic situations do many of the losses occur at one time. So most of us are "safe" when we take chances in not covering with insurance all the possible losses.

85. In general do you feel you are as well covered by insurance and savings as you can afford to be? ☒ Yes ☐ No ☒ No opinion
86. Do you feel financially secure? ☒ Yes ☐ No ☒ No opinion

Thank you for your cooperation.

87. Would you like a copy of the results of this survey? ☒ Yes ☐ No

VALIDITY OF REPORTED LIFE INSURANCE SURVEY DATA

by

ESTHER ELIZABETH KREIFELS

A. B., Nebraska State Teachers College,
Peru, Nebraska, 1953

AN ABSTRACT OF A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Family Economics

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1963

Response errors affect the validity and reliability of survey data. This study is concerned with securing an estimate of the error made in reporting life insurance information from memory recall.

The objectives of this study were: (1) to secure an estimate of the discrepancy between life insurance premium values as reported by respondents and as derived from published rate tables, and (2) to estimate the variation in discrepancy by education and age of respondent, net worth and place of residence (farm or non-farm) of the family, and face value and year of purchase of the policy.

The data analyzed in this thesis were obtained in 1960 by personal interviews with 200 Kansas rural families. The survey was part of the Kansas Agricultural Experiment Station Project, Organized Research Project No. 427, "Economic Status and Plans for Future Security of Rural Families," a contributing project to North Central Regional Research Project NC-32, "Factors Affecting the Financial Security of Rural Families."

Eighty per cent of the 200 Kansas rural families interviewed currently held some type of life insurance policy. These 160 families held a total of 547 current policies. This study included limited-pay 20, whole life, term, and paid-up at 65 policies on which there was adequate information to permit study. Other types of policies were excluded. Thus, the number of policies was reduced to 309 "workable" policies on which the first set of results are based. The second set of results, based

on "selected" data, include the 251 policies remaining after elimination of policies on which premiums varied \$15 (plus or minus) from the expected premium calculated from published rate tables. "Selected" data were considered by the investigator to give a more meaningful measure of validity and reliability than when using all "workable" data.

The method of measuring response error involved comparing the reported premiums paid annually, per thousand, with the expected premiums as determined from life insurance rate tables to find the relative error, which was the measure of validity. The average deviation of relative errors was determined as a measure of the reliability of the data. Since the data were not obtained from a study designed specifically to make these measurements, the more sophisticated tests of significance and measures of reliability were inappropriate.

The overall results indicated a low (within 8%) relative error for all policy types studied except term policies for which the error was 24 per cent. Limited-pay 20 policies were reported most consistently (15%) while term policies were reported with least consistency (46%). Errors on whole life and paid-up at 65 policy premiums fell within these extremes with consistency of 22 per cent and 28 per cent, respectively. These results indicate that an average of premiums paid by a group would be a reasonable estimate of the premiums for individual policies within the group if gross errors of estimation are eliminated, although reports within the group deviate considerably from

expected premiums.

The factors of education, age, net worth, place of residence (farm or non-farm), face value, and year of purchase of the policy appeared to have no obvious effect on the validity or reliability of the respondents' reports of policy premiums. The "selected" data provided no basis for assuming that respondents with certain socio-economic characteristics, such as higher educational or maturity level, would answer life insurance survey questions more accurately than the average for all policyholders.

The error varied more, both in amount and in consistency, between types of policies than by socio-economic characteristics of policyholders. Therefore, in subsequent studies it might be advisable to concentrate efforts to reduce reporting errors on type and face value of the policy and age of policyholder at time of purchase. Reduction in reporting errors might be accomplished by interviewers personally checking policies held by respondents, or by interviewers asking detailed and self-validating questions in an attempt to help respondents recall accurate information. If the error in this basic information is reduced, better estimates of premiums might be derived from rate tables than from respondents' answers to direct questions.